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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/572,682	04/28/2006	Yoshifumi Okabe	127103	4894
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EXAMINER				
SOOHOO, TONY GLEN				
ART UNIT		PAPER NUMBER		
1797				
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/572,682

Applicant(s)

OKABE ET AL.

Examiner

Tony G. Soohoo

Art Unit

1797

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 20 March 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-9 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-9 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☒ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/SF/ICE)
Paper No(s)/Mail Date 6/27/2006
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

DETAILED ACTION

Priority

1. Acknowledgment is made of applicant's claim for foreign priority under 35 U.S.C. 119(a)-(d). The certified copy has been filed in parent Application No. JP04/14318 , filed on 09/22/2004.

Specification

2. The disclosure is objected to because of the following informalities:
 - a. In the section titled "Detailed Description" the section repeatedly uses positive a reference to a specific claim number (i.e. "as described in claim 5", or "according to any of claims 1 to 4"). Since in prosecution, claims are amended in scope, and possibly deleted, and whereas upon an allowance of the application, the claims are renumbered, the claim number and its context may not correspond with the original claim numbering. It is suggested that applicant change the specific reference of each specific claim number to merely refer to the claims in general.

Appropriate correction is required.

Claim interpretation

The invention defined by a plain reading of the claim 1 are to the elements of:

- **a screw** (see preamble), (subcombination element)
 - o for the environment "for plastication of resin material installed in a plasticizing cylinder" (see preamble

- **100mm or less external diameter D** at a metering section of the screw (at a top part)
- **10 or less L/D section** (measured where the **spiral screw flight** is formed)
- **a screw pitch** (i.e. screw lead, thread spacing) having
 - o **a thread length** (the total length distance along the thread as it spirals round the screw)
 - o **a 30 to 300% thread length** (the thread length is 30 to 300% of a calculated number) [this chosen number is calculated from a 20-24 L/D screw and a pitch of the screw flight is the same as the D in the metering section. The particulars of L, and D, and pitch are undefined in this calculation]

Claim Rejections - 35 USC § 112

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. Claims 1-9 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.
- a. The meets and bounds of claim 1 can not be clearly determined with respect to the scope of pitch of the screw flight and its thread length thereof.

- b. In an analysis of claim 1, the screw pitch (lead) and thread length is dependent upon a comparison to an imaginary comparison screw. Instant claim 1: "a pitch of the screw flight is designed so that a thread length thereof falls within a range... [of a imaginary constructed screw having particular attributes]"
 - c. This imagery comparison screw has not been defined in such a *positive manner* that its structural meets and bound can be determined so that a comparison can be made between the instant invention and the imaginary screw. Instant claim 1: "[the instant invention's thread length] falls within a range of 30 to 300% of a thread length of a [comparison] screw in which an L/D ratio is 20 to 24 and a pitch of a screw flight is designed to be the same as an external diameter D of a metering section" (emphasis added)
 - d. Since the Diameter D, and length L is undefined as to the scope of the comparison screw, the corresponding pitch, and pitch length of the instant invention remains undeterminable.
5. Claims 1-9 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.
- a. The claims utilized the same name for apparently different elements which renders the claim unclear in which element is being referred to. Applicant is reminded if there is a reference to a previously established element, the phrase "said [element]" or "the [element]" should be used.

Examples are:

- b. Claim 1, line 3, "a metering section", and line 10-11. Is the second instance directed to the metering section in line 3, and line 5, or directed to a new and different metering section of a different structure? (such as the "a screw" described in line 9).
 - c. Claim 1, line 1, "A screw" and claim 1, line 9, "a screw".
 - d. Claim 1 line 8, "a pitch of the screw flight" and claim 1, line 10.
 - e. Claim 1, line 3, "an external diameter", and claim 1 ,line 1.
2. Claims 3-4 (dependent upon claim 1), recites the limitation "the feed section" in claim 3, line 3 and "the compression section" in claim 3, line 7. There is insufficient antecedent basis for this limitation in the claim.
3. Claims 5, 8-9 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claims 5, 8-9 apparently are directed to the combination of the screw subcombination with additional elements. However the claim is narrative to the how the device is made (i.e. "is installed in the plasticizing cylinder" and does not positively claim the "cylinder" as a positive element of the "plasticizing

mechanism" combination. Accordingly the claims 5, and 8-9 appear to fail to distinctly claim the cylinder as part of the instant invention.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 1, 3 and 4 are rejected under 35 U.S.C. 103(a) as being unpatentable over Uehara et al 6228308 in view of "Screw and Barrel Technology" SPIREX 1985.

The Uehara (et al) reference discloses a screw, with an external diameter D of a size of (50mm), L/D of 23, a pitch (Lf, Lc2, Lci Lm), see examples 1-27 and the corresponding tables. The pitch of the screw flight is the feed section Sf is larger than the pitch Lm in the metering section, and the pitch in the compression section Lc1 Lc2, Lci are gradually smaller.

The Uehara reference discloses all of the subject matter as recited in the claims with the exception of having the L/D being less than 10, and having the pitch spacing of Lm/Lc1/Lci/Lf provide a total length of (the calculated number).

Regarding the choice of an L/D ratio of 10 or less, the reference titled "Screw and Barrel Technology" (now referred to as SPIREX 1985) teaches that the L/D ratio is a common and effective variable whereby smaller L/D lowers

residence time, reduces power consumption, and provides less investment cost.
(see page 5, 6).

In view of the teaching the SPIREX 1985 document, in light of the knowledge gleaned by the prior art, it would have been obvious to a person having ordinary skill in the art to change the size of screw to a smaller L/D so that residence time is reduced, since such a modification would have involved a mere change in the size of a component. A change in size is generally recognized as being within the level of ordinary skill in the art. In re Rose, 105 USPQ 237 (CCPA 1955).

Regarding, and having the pitch spacing at $L_m/L_c1/L_{ci}/L_f$ provide a total length of a calculated number of instant claim 1, lines 9-11, It is note that the device as modified by the SPIREX 1985 reference would have a screw pitch and thread length. This screw pitch and thread length would meet the numerical value within the range of 30-300% if the appropriate values are chosen for L, D and pitch are chosen a comparison.

Regarding claim 4 as to the issue of the pitch of the feed section being 1.5 times as large as the pitch of the metering section. It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the relative values of L_f be 1.5 times of L_f , so that effective shear force is provided as the material melts, since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. In re Boesch, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

6. Claims 1-4, 6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gisko 5662415 in view of "Screw and Barrel Technology" SPIREX 1985.

The Gisko reference discloses a screw (for example fig 5), with an external diameter D at the feed section 70, and a smaller diameter metering section 72, a definable L/D , and differing a pitches and channel depth as compared from the feed 70 to that of the metering section 72. The pitch of the screw flight in the feed section is larger than the pitch in the metering section, and the pitch in a compression section 68, 73 are gradually smaller.

The Gisko reference discloses all of the subject matter as recited in the claims with the exception of having the L/D being less than 10, and having the pitch spacing of $L_m/L_c/L_i/L_f$ provide a total length of (the calculated number).

Regarding the choice of an L/D ratio of 10 or less, the reference titled "Screw and Barrel Technology" (now referred to as SPIREX 1985) teaches that the L/D ratio is a common and effective variable whereby smaller L/D lowers residence time, reduces power consumption, and provides less investment cost. (see page 5, 6).

In view of the teaching the SPIREX 1985 document, in light of the knowledge gleaned by the prior art, it would have been obvious to a person having ordinary skill in the art to change the size of screw to a smaller L/D so that residence time is reduced, since such a modification would have involved a mere change in the size of a component. A change in size is generally recognized as

being within the level of ordinary skill in the art. In re Rose, 105 USPQ 237 (CCPA 1955).

Regarding, and having the pitch spacing to provide a total length of a calculated number of instant claim 1, lines 9-11, It is note that the device as modified by the SPIREX 1985 reference would have a screw pitch and thread length. This screw pitch and thread length would meet the numerical value within the range of 30-300% if the appropriate values are chosen for L, D and pitch are chosen a comparison.

Regarding claim 4 as to the issue of the pitch of the feed section being 1.5 times as large as the pitch of the metering section. It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the relative values of L_f be 1.5 times of L_f , so that effective shear force is provided as the material melts, since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. In re Boesch, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

7. Claims 5, 7-9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gisko 5662415 in view of "Screw and Barrel Technology" SPIREX 1985.as applied to respective claims 1, 2, 3, 4 above, and further in view of Olmsted 4065108.

The Gisko 5662415 in view of "Screw and Barrel Technology" SPIREX 1985 discloses all of the recited subject matter as established above including a cylinder housing 24, 48, see figure 1-4.

The Gisko reference does not disclose a torpedo plate downstream the screw.

The reference to Olmstead teaches that a resin screw extruder may have a shorter screw 20 and a torpedo 50 downstream of the screw for provide a plastic melt characteristic, col. 1, lines 40-49, and col. 4, lines 11-35.

In view of the teaching of Gisko, in light of the knowledge gleaned by the prior art, it would have been obvious to a person having ordinary skill in the art to make the provide for the shorter L/D screw of the modified Gisko device with an additional torpedo so as to provide a device which can provide a mottled or marbled appearance.

Conclusion

8. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. The following patents disclose screws with different pitched elements: Cucchisi et al 5156790, Carter et al 3795386, Blakeslee, III 4310484, Eshima 5141326, Meyer 4184772, List 2505125. US 2007/0104021 is the Pregrant publication of this application.

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tony G. Soohoo whose telephone number is (571) 272 1147. The examiner can normally be reached on 8AM-5PM, Tues-Fri.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Walter Griffin can be reached on 571-272-1189. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Tony G Soohoo/
Primary Examiner, Art Unit 1797

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